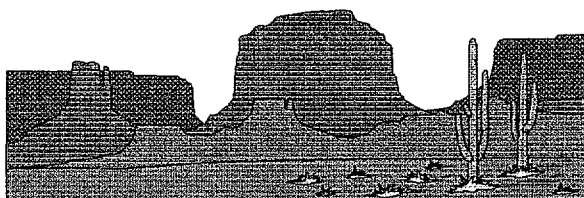


AVIATION DEMAND FORECASTS



DOUGLAS MUNICIPAL AIRPORT MASTER PLAN

CHAPTER IV: AVIATION DEMAND FORECASTS

4.0 INTRODUCTION

In order to determine what additional facilities might be needed at an airport, future aviation demand must be forecasted. Demand forecasts are normally made in 5-year increments over a twenty year planning horizon. Therefore, forecasts of aviation activity have been developed in five year increments through the year 2014. The forecasts project trends, but due to the many unforeseeable factors that affect general aviation, they should not be considered definite activity levels in the indicated years. Rather, they should be viewed as conservative levels that could reasonably be expected. Their chief value actually lies in establishing the size and configuration of facilities that will be required when certain activity levels are actually reached. This activity level could be reached earlier or later than actually forecast, but it is still the point at which facility development should be initiated.

4.1 FORECAST ASSUMPTIONS

There are many factors that can influence aviation activity both nationally and locally. Often opposing factors are at work during the same time. The gross national product, inflation, restriction in the supply of money, short- and long-term interest rates, fuel costs, insurance costs, and unemployment levels affect general and commercial aviation on a national scale in several ways. Similar effects are felt in smaller areas, tempered somewhat by unique local conditions.

A high rate of inflation reduces real disposable personal income for many persons who might use general aviation facilities or fly via commercial airlines, and also increases the cost of using these facilities. In theory, high interest rates tend to reduce the sale of new and used aircraft. High unemployment rates cause people to be more cautious in their expenditures. However, higher corporate profits resulting from higher

prices may increase funds for corporate aviation facilities and airline travel. In general, a healthy local economy results in a substantial demand for aviation services and facilities. A few of the factors influencing aviation demand at the Douglas Municipal Airport are listed in Table IV-1.

**TABLE IV-1
FACTORS AFFECTING AVIATION ACTIVITY TRENDS
AT THE DOUGLAS MUNICIPAL AIRPORT**

Factors which may increase demand	Factors which may decrease demand
<ul style="list-style-type: none">* The passage of the North American Free Trade Agreement and subsequent increase in international trade between the United States and Mexico* Advances in telecommunications (i.e., computer modems, FAX machines) enhance convenience of business travel by air (i.e., charters, commuter or private pilots)* Overall population of Cochise County and region continues to show growth	<ul style="list-style-type: none">* Production of new GA aircraft is still declining while the cost per unit continues to escalate* Fuel and insurance costs will continue to increase

4.2 AREA AVIATION FACILITIES

Competition for aeronautical services in the immediate area of Douglas Municipal Airport consists mainly of surrounding general aviation airports, with the nearest commercial service airports at Tucson International Airport, approximately 86 nautical miles (NM) northwest, and Sierra Vista Municipal Airport, approximately 46 NM northwest. Cochise County currently has eight public use airports, which necessitated the recent Cochise County Airport System Plan. This plan specifically outlines the unique service area of each airport, and stresses the importance of maintaining each of these facilities. Therefore, due to the specific and relatively moderate size of Douglas Municipal Airport's service area, it is anticipated that the airport will be able to meet any future demand placed on it for aviation services throughout the twenty year planning period.

4.3 COMMERCIAL ENPLANEMENTS

Commercial airline service was offered in the past at Douglas Municipal Airport by Standard Airlines, and later, American Airlines. However, commercial service is not anticipated to return to Douglas Municipal Airport within the twenty year planning period. Commercial service is offered from Tucson International Airport and Sierra Vista Municipal Airport. Because commercial service is relatively close to the Douglas area, no commercial enplanements or operations forecasts exist for the Douglas Municipal Airport at this time.

4.4 BASED AIRCRAFT

The number of based aircraft at an airport is an indicator of general aviation demand. Table IV-2 provides historical trends for based aircraft at Douglas Municipal Airport using information obtained from the FAA Airport Master Record Form 5010-1 and records from the local Fixed Base Operator (FBO).

TABLE IV-2
HISTORICAL BASED AIRCRAFT
DOUGLAS MUNICIPAL AIRPORT

YEAR	TOTAL AIRCRAFT	SINGLE ENGINE	MULTI ENGINE	TURBOPROP/ TURBOJET	HELI- COPTER	ULTRA LIGHT
1988	24	20	1	0	2	1
1989	30	23	2	0	2	3
1990	29	23	2	0	1	3
1991	20	17	1	0	1	1
1992	26	23	3	0	0	0
1993	26	23	3	0	0	0

Source: FAA Form 5010-1 and Fixed Base Operator (FBO)

Forecasts of the future number of based aircraft at the Douglas Municipal Airport will form the foundation for many other aspects of aviation demand at the airport. The forecast of based aircraft is dependent upon population, spendable income, and the demand for aviation services within the airport's area of influence. The City of Douglas' economic base

consists of manufacturing, services, and retail trade businesses, as demonstrated in Chapter III, Socioeconomic Characteristics. An increasing number of businesses throughout the United States are using general aviation aircraft as a more efficient mode of transportation. Air travel is more convenient, less time consuming, and more productive for these businesses. The Douglas Municipal Airport is poised to provide an excellent access point to the region if the airport facilities are able to accommodate common business aircraft, such as Beech King Airs, Cessna 310's and 441's, Rockwell Aerocommanders, Gates Learjets and the Falcon series of aircraft. This will become a more critical issue for Douglas Municipal Airport as NAFTA begins to enable less restricted trade activity between the United States and Mexico. For example, according to the Douglas Economic Development Corporation, commercial truck traffic between the United States and Mexico through Douglas doubled in activity levels from January through February of 1993 to January through February of 1994. This type of increase in trade activity is likely to carry over to the aviation transportation industry, and should convince the sponsor of Douglas Municipal Airport to develop its airport to accommodate the types of business aircraft previously described.

The relationship between area wide population and based aircraft was tested to determine a factor for based aircraft per 10,000 people. According to the National Plan of Integrated Airport Systems (NPIAS), the average number of aircraft per 10,000 people in the State of Arizona is 18. However, it would be misleading to use this factor of 18 for the Douglas Municipal Airport area, as there are currently eight public use airports within Cochise County with a combined 1992 based aircraft forecast total of 151 (according to the 1994 Cochise County Airport System Plan). These numbers result in 15 based aircraft per 10,000 people in Cochise County. Based on 1992 based aircraft figures for Cochise County, based aircraft at Douglas Municipal Airport accounted for approximately 17 percent of the total County-wide figure. It is expected that due to the unique role of each airport in Cochise County, that Douglas Municipal Airport will maintain this percentage of total based aircraft in the County throughout the planning period. Therefore, by using population forecasts for Cochise County as provided in the 1993 Arizona Statistical Abstract, a factor of 0.0015 based aircraft per 10,000 people in Cochise County, and an approximate 17 percent share of the County based aircraft total for Douglas Municipal Airport, a forecast of based aircraft was determined and is shown in Table IV-3.

**TABLE IV-3
BASED AIRCRAFT FORECAST
DOUGLAS MUNICIPAL AIRPORT**

YEAR	COCHISE COUNTY POPULATION*	TOTAL BASED AIRCRAFT	SINGLE ENGINE	MULTI- ENGINE	TURBO- PROP/TURBOJET
1994	104,191	27	23	3	0
1999	111,455	28	25	3	0
2004	118,559	30	26	4	0
2009	125,837	32	27	4	1
2014	133,571	34	28	4	2

* *Cochise County population forecasts were obtained from the 1993 Arizona Statistical Abstract for the years 1994 - 2002 and 2005.*

Population forecasts for other years were extrapolated from figures provided in the abstract.

4.5 GENERAL AVIATION OPERATIONS FORECAST

General Aviation (GA) operations are categorized as either *local* or *itinerant* depending on the nature of the flight. Local GA operations consist mainly of training activity and are defined as operations performed by aircraft that:

- Operate in the local traffic pattern or within sight of the airfield;
- are known to be departing for or arriving from flights in local practice areas located within a 20-mile radius of the airfield; or
- execute simulated instrument approaches or low passes at the airport.

Itinerant GA operations are defined as all aircraft arrivals and departures other than local GA operations.

Because Douglas Municipal Airport does not have a control tower, aircraft operations have not been systematically counted in the past. However, fuel sales records have been accurately maintained over the past two years

and provide a general indication of the level of activity at the airport and also a trend in seasonal type operations. A portion of this information is provided in Table IV-4.

TABLE IV-4
1993 FUEL SALES
DOUGLAS MUNICIPAL AIRPORT

MONTH	AVIATION GAS SOLD (IN GALLONS)	JET A FUEL SOLD (IN GALLONS)
January	5,625	800
February	5,742	1,200
March	3,976	600
April	4,854	800
May	4,061	400
June	4,811	809
July	3,652	1,000
August	3,174	1,035
September	5,312	526
October	5,444	1,730
November	6,079	3,100
December	4,886	1,201

As shown in the above table, activity at Douglas Municipal Airport (according to fuel sales records only) seems to fluctuate regularly throughout the year, and summer months tend to not yield as many operations as winter months.

Annual operations estimates are also provided by the FAA on Form 5010-1, Airport Master Record. These figures for 1988 through 1992 are listed in Table IV-5. The Fixed Base Operator at Douglas Municipal Airport estimates 1993 annual operations at approximately 11,300.

TRW flights occur daily at Douglas Municipal Airport, primarily for refuelling purposes. These operations are by Cessna L-19's, or "Bird Dogs", and they typically land twice a day, five days a week.

**TABLE IV-5
HISTORICAL ANNUAL OPERATIONS ESTIMATES
DOUGLAS MUNICIPAL AIRPORT**

YEAR	AIR TAXI	GENERAL AVIATION LOCAL	GENERAL AVIATION ITINERANT	MILITARY	TOTAL ANNUAL OPERATIONS
1988	3,000	1,900	5,000	100	10,000
1989	3,500	2,500	5,000	100	11,100
1990	3,500	2,500	5,000	100	11,100
1991	3,500	2,500	5,000	100	11,100
1992	3,500	2,500	5,000	100	11,100

Source: FAA Form 5010-1, Airport Master Record

Operations forecasts are extremely important in determining future development at an airport, which will be discussed in Chapter V, Facility Requirements. As discussed earlier, the passage of the North American Free Trade Agreement (NAFTA) is intended to lessen restrictions for businesses in the United States, Mexico, and Canada and to encourage international trade. However, the information available on the expected impacts to border communities such as Douglas from NAFTA is limited at this time. Though it is expected that NAFTA will have a positive impact on annual operations at Douglas Municipal Airport, it is hard to determine when these benefits will come to fruition. Therefore, two forecasts have been developed. Forecast A is a "high" forecast and will show the anticipated growth in annual operations as a direct result of increased trade through aviation transportation from NAFTA. Forecast B is a "low" forecast and will anticipate no significant increase in annual operations figures due to NAFTA. A planning forecast for the Douglas Municipal Airport will then be derived from these two independent forecasts.

4.5.1 Forecast A - "High" Forecast

Forecast A was developed under the pretext that aviation activity levels at Douglas Municipal Airport will be increased as a direct result of the passage of NAFTA, and that these increased levels of activity will be seen within the first five years of the planning period. The annual operations under Forecast A for 1994 through 2014 are estimated to have an average annual growth rate of

approximately five percent for the first five years. The remainder of the forecast period will have an annual growth rate of approximately 1.5 percent.

It is estimated that existing annual operations are split equally, with 50 percent local operations and 50 percent itinerant operations. However, the ratio of local to itinerant activity will change to approximately 40 percent/60 percent, respectively, after the first five years, as recommended development occurs. Table IV-6 shows the relationship of the annual growth rate for aircraft operations and also the local/itinerant ratio for the next twenty years. The air taxi/charter operations figure for 1994 was obtained from the FAA Form 5010, and is a reasonable estimate, according to conversations with the local FBO. Air taxi/charter operations will increase only moderately at one percent a year. Military operations have historically represented approximately 300 operations per year, and are forecasted to remain the same throughout the twenty year planning period.

**TABLE IV-6
FORECAST A - ANNUAL AIRCRAFT OPERATIONS
DOUGLAS MUNICIPAL AIRPORT**

Description	1994	1999	2004	2009	2014
General Aviation - Itinerant Operations	3,750	6,260	6,820	7,420	8,080
General Aviation - Local Operations	3,750	4,180	4,540	4,950	5,380
Total General Aviation Operations	7,500	10,440	11,360	12,370	13,460
Air Taxi/Charter	3,500	3,680	3,870	4,060	4,270
Military	300	300	300	300	300
TOTAL ANNUAL OPERATIONS	11,300	14,420	15,530	16,730	18,030

Note: All numbers have been rounded to the nearest ten.

4.5.2 Forecast B - "Low" Forecast

Forecast B was developed to ascertain the level of activity at the Douglas Municipal Airport assuming that the passage of NAFTA

would not have a significant impact on air traffic to the area until after the planning period. This results in a more conservative operations forecast than that shown in Forecast A. Forecast B uses the same 1994 total annual operations figure of 11,300 as shown in Table IV-7. However, the average annual growth rate is shown at 1.5 percent throughout the twenty year planning period. The forecast further provides an estimate of 50 percent local/50 percent itinerant operations from 1994 to 2014. Military operations also remain at 300 annual operations.

**TABLE IV-7
FORECAST B - ANNUAL AIRCRAFT OPERATIONS
DOUGLAS MUNICIPAL AIRPORT**

Description	1994	1999	2004	2009	2014
General Aviation - Itinerant Operations	3,750	4,095	4,470	4,885	5,325
General Aviation - Local Operations	3,750	4,095	4,470	4,885	5,325
Total General Aviation Operations	7,500	8,190	8,940	9,770	10,650
Air Taxi/Charter	3,500	3,680	3,870	4,060	4,270
Military	300	300	300	300	300
TOTAL ANNUAL OPERATIONS	11,300	12,170	13,110	14,130	15,220

Note: All numbers have been rounded to the nearest ten.

4.5.3 Planning Forecast

A review of the previously developed forecasts shows that Forecast A involves an approximate average annual growth rate of 2.39 percent, compared to an approximate average annual growth rate of 1.5 percent for Forecast B. The planning forecast has been developed to reflect a "compromise" between the high and low forecasts, and therefore was calculated by averaging the annual operations figures of Forecast A and Forecast B for each planning year. Also, it is believed that a local to itinerant operations split of 40 percent/60 percent respectively after the first five years is a reasonable figure, given the anticipated increase from business related itinerant travel. The planning forecast is provided in Table

IV-8. Figure 4-1 also provides a graphic of Forecast A, Forecast B, and the planning forecast.

TABLE IV-8
PLANNING FORECAST OF ANNUAL AIRCRAFT OPERATIONS
DOUGLAS MUNICIPAL AIRPORT

Description	1994	1999	2004	2009	2014
General Aviation - Itinerant Operations	3,750	5,590	6,090	6,640	7,230
General Aviation - Local Operations	3,750	3,725	4,060	4,430	4,825
Total General Aviation Operations	7,500	9,315	10,150	11,070	12,055
Air Taxi/Charter	3,500	3,680	3,870	4,060	4,270
Military	300	300	300	300	300
TOTAL ANNUAL OPERATIONS	11,300	13,295	14,320	15,430	16,625

Note: All numbers have been rounded to the nearest ten.

4.5.4 Operations Forecast Comparisons

The itinerant operations forecast can be compared to results of FAA surveys at non-towered general aviation airports across the nation. A 1990 baseline estimate of 5,000 itinerant operations with 26 based aircraft at Douglas Municipal Airport results in approximately 192 annual operations per based aircraft. As shown in Figure 4-2, the median number of annual itinerant operations at non-towered airports is approximately 220 operations per based aircraft. The itinerant operations forecast numbers provided in the planning forecast from 1994 to 2014 result in an average of 178 itinerant operations per based aircraft over the twenty-year planning period, which is less than the FAA survey average.

4.6 FLEET MIX

The forecast of operations by aircraft type (fleet mix) is important in determining the needs of the airport in accordance with the FAA's design standards for airport development. The FAA Advisory Circular 150/5300-13 defines the various types of aircraft according to their approach speed and wingspan. Together they form the Airport Reference Code (ARC). Douglas Municipal Airport has aircraft operations which

FIGURE 4-1
ANNUAL OPERATIONS FORECASTS
DOUGLAS MUNICIPAL AIRPORT

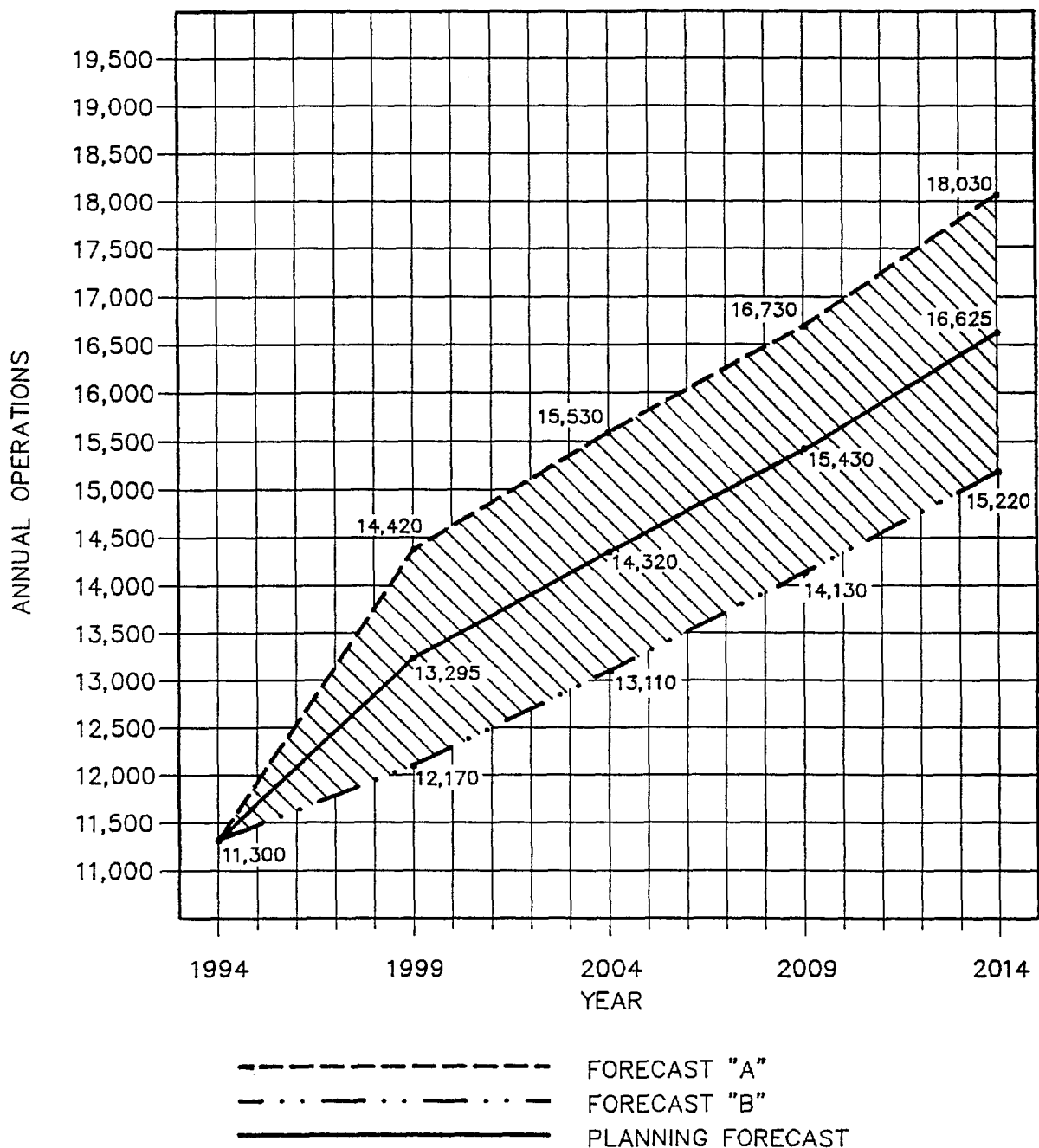
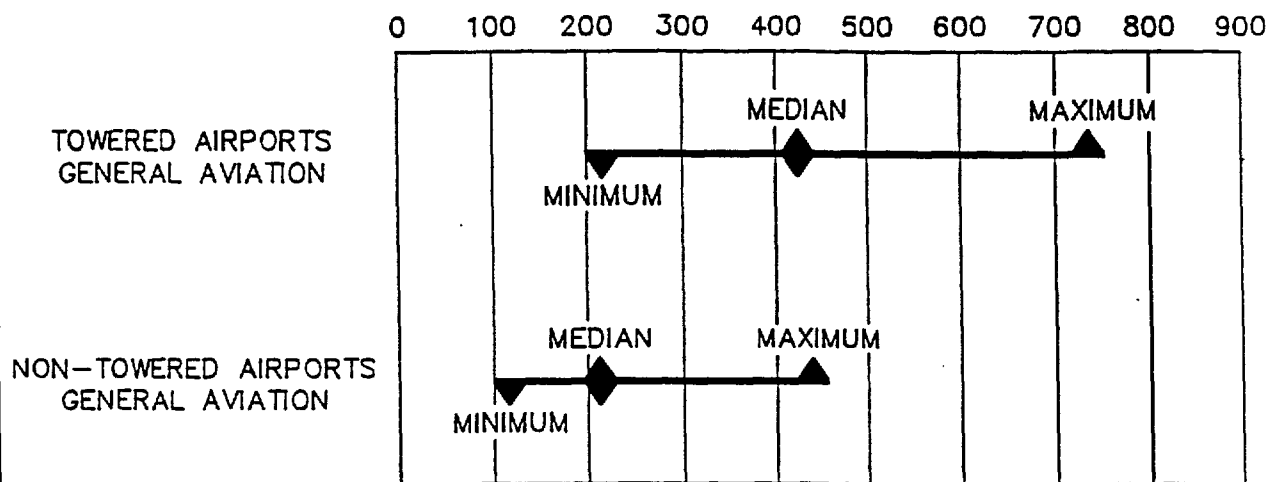


FIGURE 4-2 ITINERANT OPERATIONS SURVEY

NUMBER OF ITINERANT GENERAL AVIATION OPERATIONS
PER BASED AIRCRAFT



SOURCE:
FAA SURVEYS

fall under several different ARC categories. Chapter II, Facility Inventory, provides a listing of example aircraft which use the Douglas Municipal Airport. However, the existing type of GA aircraft that has at least 500 operations per year are those aircraft having an ARC of B-II weighing 12,500 pounds or less.

General Aviation is made up of the following general areas of flying:

1. Executive Flying: This is identified as flying performed by corporate aircraft. These aircraft are flown by a full time pilot and are used to transport company executives and/or cargo. The aircraft used for this function range in complexity and performance from single engine piston type aircraft to larger turbojets.
2. Business Flying: Many business men and women own and pilot their own aircraft to transport themselves, their employees, and cargo. This is identified as business flying.
3. Industrial Special: This category includes powerline patrol, aerial photography, helicopter hoist, and other specialty work. An example of Industrial Special would include the majority of helicopter operations at an airport.
4. Aerial Application: This includes the aerial distribution of chemicals or seeds in agriculture, reforestation, or insect control, but excludes fire fighting operations.
5. Personal Flying: In this category, the private individual flies his or her own/rental airplane on business trips; e.g., for visiting friends and relatives, for medical or educational purposes, for vacations or for other personal reasons.
6. Instructional Flying: This type of flying includes instructional flying to obtain an original private pilot's license or other, more advanced categories of pilot license. It also includes proficiency flying by the pilot to maintain and improve his or her flying skills.

These categories of General Aviation operations provide the basis for determining the specific fleet mix of operations at Douglas Municipal Airport. The forecasts for this fleet mix are depicted in Table IV-9. Single engine operations account for approximately 95 percent of the total

operations, while multi-engine operations comprise approximately three percent. Turbo-prop/turbojet and helicopter operations will form the remaining two percent of annual operations.

**TABLE IV-9
FORECASTED FLEET MIX OPERATIONS
DOUGLAS MUNICIPAL AIRPORT**

	1994	1999	2004	2009	2014
Single Engine	10,735	12,630	13,600	14,660	15,790
Multi Engine	340	400	430	460	500
Turbo-Prop/Turbojet	100	135	150	160	175
Helicopter	125	130	140	150	160
TOTAL ANNUAL OPERATIONS	11,300	13,295	14,320	15,430	16,625

Note: All numbers have been rounded to the nearest ten.

As a result of the based aircraft and general aviation operational forecasts, the future and ultimate design aircraft for Douglas Municipal Airport can be determined. The existing design aircraft of B-II weighing less than 12,500 pounds is expected to remain the design aircraft for the next ten to fifteen years, even though the fleet mix forecast calls for an increase in multi-engine and turbo-prop/turbojet activity. However, as the City of Douglas continues to utilize the Maquiladora program and takes advantage of NAFTA, it is reasonable to expect that large aircraft (those weighing less than 25,000 pounds) will use the airport more frequently, and ultimately become the design aircraft for Douglas Municipal Airport. These large aircraft types include the DeHavilland Twin Otter, Rockwell Sabreliner 65 and Cessna Citation II and III.

4.7 ANNUAL ITINERANT OPERATIONS

Although Douglas Municipal Airport does not currently have an instrument approach procedure, it is feasible to expect that at least a nonprecision instrument approach such as an NDB or Loran-C or even GPS will be established sometime in the future. Therefore, it is important to estimate the number of annual instrument approaches in order to best determine which type of navigational aid will be serve the airport users. An instrument approach is defined by the FAA as "an approach to an airport with intent to land by an aircraft in accordance with an Instrument Flight Rule (IFR) flight plan when visibility is less than three miles and/or when the ceiling is at or below the minimum initial approach altitude.

By examining historical weather records for the Douglas area, it was determined that actual IFR weather conditions (less than three miles visibility and ceiling less than 1,000 feet) occurs approximately 1.0 percent of the time. Therefore, estimates of Annual Instrument Approaches (AIA's) at Douglas Municipal Airport was determined by applying this factor of 1.0 percent to the forecasted itinerant approaches. Table IV-10 summarizes the AIA estimates for Douglas Municipal Airport.

TABLE IV-10
ESTIMATE OF ANNUAL INSTRUMENT APPROACHES

	1994	1998	2004	2008	2013
Total Annual Operations	11,300	13,295	14,320	15,430	16,625
Itinerant Approaches*	1,875	2,795	3,045	3,320	3,615
Annual Instrument Approaches	19	28	30	33	36

* *Itinerant approaches figure equals one-half of the itinerant operations estimate in Table IV-6*

4.8 SUMMARY

During the first five years of the forecast period, forecasts can be considered reasonably accurate. However, as one projects further into the future, forecasts may become less accurate due to unforeseen fluctuations in the economy and aviation industry. Therefore, an extremely optimistic forecast may not be as usable as a conservative, more realistic forecast. The forecasts developed for Douglas Municipal Airport are based on the FAA's Form 5010, Airport Master Record, annual fuel sales records from the local FBO, and an awareness of the increasing trend in overall general aviation activity seen throughout the Western United States. The forecasts also recognized studies already completed by the Arizona Department of Transportation and the Cochise County Airport System Plan. The forecasts developed in this Master Plan are felt to be more conservative than overly optimistic.